National Institute of Environmental Health Sciences

Climate change influence on POPs distribution and fate: A case study

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Abstract:

Climate change has the potential of affecting the behaviour and distribution of organic pollutants, including POPs. Direct effects of climate change, like temperature increase, modification of wind and precipitation patterns, sea level rise, snow and ice cover, may be very effective in altering the partitioning of POPs among the environmental compartments. Other consequences of future climate scenarios may imply the alteration of degradation rates, soil properties (and hence land use), air-particle partitioning of chemicals and so forth. A case study is here presented to illustrate the major implications of climate change on the long term at the local scale. A dynamic multimedia model was applied to selected PCB and PCDD/F congeners to simulate the effects of climate change on their distribution and fluxes over the next 50 y in the Venice Lagoon (Italy). Different climate change scenarios were tested, finding noticeable variations in POPs concentration even for minor environmental changes. PCBs and PCDFs environmental concentrations may differ by a factor two in a moderate climate change scenario, compared to a situation with stable climate over the next 50 y. However, model results also suggest that if global warming may have the potential of reducing the environmental levels of these chemicals, it would probably enhance their mobility and hence their potential for long range atmospheric transport.

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Resource Description

Communication: ☑

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☑

audience to whom the resource is directed

Researcher

Exposure : ☑

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Other Exposure

Geographic Feature: ☑

resource focuses on specific type of geography

Ocean/Coastal

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Italy

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content